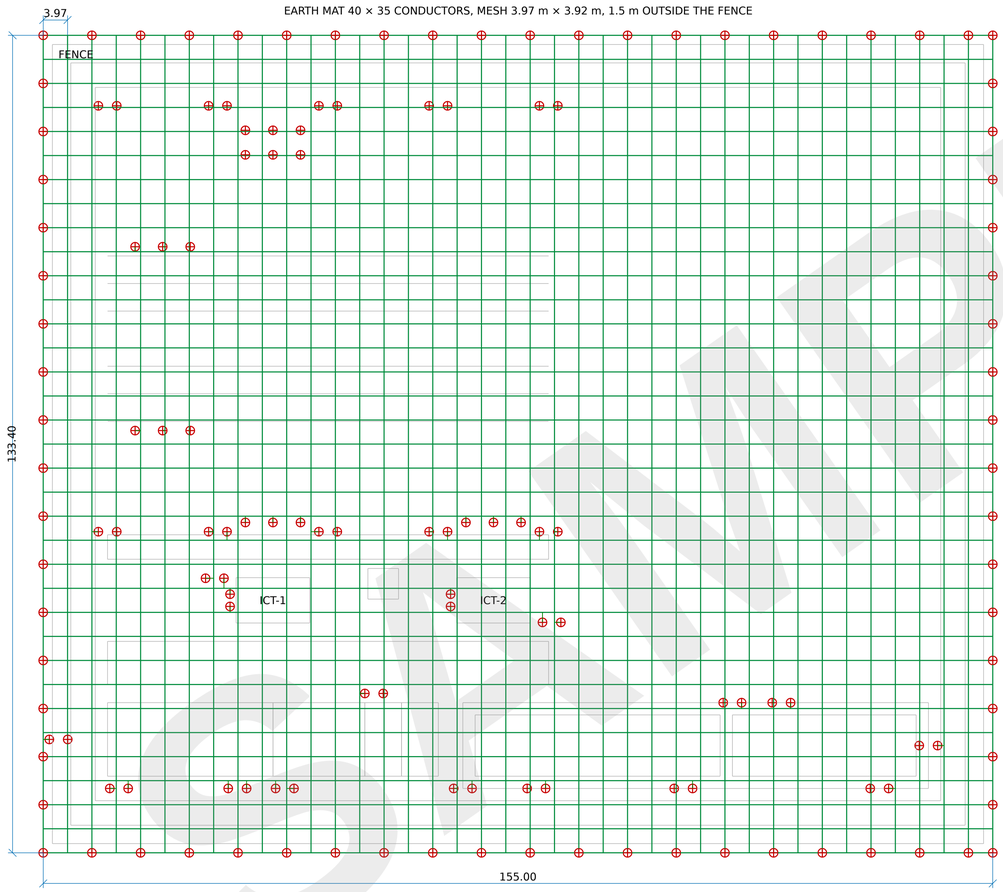
N

EARTH MAT LAYOUT (SCALE 1:500)

0 10 20 m



RESULTS (IEEE Std 80-2013)

Soil resistivity ρ 100 Ω·m (entered value) × season factor 1.5 = 150 Ω·m. Gravel 3000 Ω·m × 0.10 m, surface factor Cs 0.705.

Grid current IG = decrement factor Df 1.062 × split factor Sf 0.6 × 50.00 kA = 31.85 kA. Shock duration ts 0.50 s.

Grid resistance Rg 0.476 Ω (IEEE 80 Eq. 52). IS 3043 / Laurent 0.476 Ω. Rise of earth potential GPR 15.15 kV.

Mesh (touch) voltage 577.6 V · limit 684.6 V (50 kg body, 70 kg: 926.6 V) · Pass

Step voltage 1450.6 V · limit 2246.3 V (50 kg body, 70 kg: 3040.3 V) · Pass

Conductor: 608.9 mm² (Eq. 37, steel, 500 °C) → 27.84 mm + 6 mm corrosion → 40 mm MS rod.

QUANTITIES

MS rod 40 mm dia, earth mat at 0.6 m: 10 761 m

MS rod electrode 40 mm × 3 m: 144 nos

GS flat 75 × 12 mm risers (≈2 × 3 m per structure): 546 m

Gravel 20 677 m² × 0.10 m: 2068 m³

NOTES

1. Mat buried at 0.6 m. Crossings welded. Risers GS flat 75 × 12 mm, two per equipment structure.
2. Electrodes at the mat perimeter and at each surge arrester, CVT, transformer HV neutral and NGR, bonded to the nearest mat conductor.
3. Fence bonded to the mat. Outer conductor 1.5 m outside the fence.
4. Grid 155.00 m × 133.40 m, 10 761 m of conductor, 144 electrodes.

LEGEND

Green: earth mat conductor. Red circle with cross: earth electrode. Grey: yard outline for reference.

SubstationLayout

REV	DATE	DESCRIPTION	BY
0	2 Nov 2026	Issued	Sample engineer

PROJECT	Sample 220/33 kV pooling substation
CLIENT	Sample client
LOCATION	Sample site
TITLE	EARTH MAT LAYOUT 220/33 kV POOLING SUBSTATION, 250 MW

	NAME	DATE
DRAWN	Sample engineer	2 Nov 2026
CHECKED	Sample engineer	2 Nov 2026
APPROVED	Sample engineer	2 Nov 2026

DRG. NO.	SSL-E-EAR-001	REV.	0
SCALE	1:500	SIZE A1	Sheet 1 of 1

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